

CLAIMS

We claim:

5 1. A method of assessing vehicle operator performance, the method comprising the steps of:

receiving vehicle operating data from the vehicle relating to the vehicle operating condition;

monitoring an interior portion of the vehicle and receiving operator

10 activity data from the interior portion of the vehicle relating to activities of the operator within the interior portion;

receiving vehicle environment data from the environment external to the vehicle;

15 monitoring the vehicle operator and receiving operator condition data relating to a condition of the vehicle operator; and

determining an operator assessment value, wherein the operator assessment value is based upon the vehicle operating data, the operator activity data, the environment data and the operator condition data and is indicative of vehicle operator performance.

20 2. The method of claim 1, wherein the step of receiving data from the vehicle relating to the vehicle operating condition comprises receiving data relating to at least one of: vehicle speed and vehicle acceleration.

25 3. The method of claim 1, wherein the step of receiving data from the vehicle relating to the vehicle operating condition comprises receiving data relating to at least one of: throttle application, brake application and steering wheel input.

30 4. The method of claim 3, wherein throttle application comprises at least one of throttle position, rate of change of throttle position, additional available throttle input and throttle applicator pressure.

5. The method of claim 3, wherein the brake application comprises at least one of brake position, rate of change of brake position, additional available brake input and brake applicator pressure.

5 6. The method of claim 3, wherein the steering wheel input comprises at least one of steering wheel position, rate of change of the steering wheel, operator pressure applied to the steering wheel and additional available steering input.

10 7. The method of claim 1, wherein the step of receiving data from the vehicle relating to the vehicle operating condition comprises receiving data relating to an operating parameter of the vehicle.

15 8. The method of claim 1, wherein the step of monitoring an interior portion of the vehicle comprises monitoring the usage of vehicle system controls by the operator.

20 9. The method of claim 8, wherein the vehicle system controls comprise driving controls.

10 10. The method of claim 8, wherein the vehicle system controls comprise telematics controls.

25 11. The method of claim 8, wherein the vehicle system controls comprise occupant comfort controls.

12. The method of claim 8, wherein the vehicle system controls comprise infotainment controls.

30 13. The method of claim 8, wherein the vehicle system controls comprise communication controls.

14. The method of claim 1, wherein the step of monitoring the vehicle operator comprises monitoring a physical condition of the operator.

15. The method of claim 14, wherein the physical condition comprises fatigue.

16. The method of claim 14, wherein the physical condition comprises intoxication.

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17. The method of claim 1, wherein the step of monitoring the vehicle operator comprises monitoring a psychological condition of the operator.

10 18. The method of claim 1, wherein the step of monitoring an interior portion of the vehicle comprises monitoring a distraction condition of the operator.

19. The method of claim 1, wherein the step of monitoring an interior portion of the vehicle comprises monitoring vehicle passengers.

15 20. The method of claim 1, wherein the step of receiving data from the environment comprises receiving road condition data.

21. The method of claim 1, wherein the step of receiving data from the environment comprises receiving lane following data.

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22. The method of claim 1, wherein the step of receiving data from the environment comprises receiving headway data.

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23. The method of claim 1, wherein the step of receiving data from the environment comprises receiving traffic control data.

24. The method of claim 1, wherein the step of receiving data from the environment comprises receiving traffic condition data.

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25. The method of claim 1, wherein the step of determining an operator assessment value comprises inferring performance of the operator from the vehicle operating data, the operator activity data, the environment data and the operator condition data.

26. The method of claim 1, the step of determining an operator assessment value comprises utilizing an inference engine to infer performance of the operator from the vehicle operating data, the operator activity data, the environment data and the operator condition data.

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27. The method of claim 1, wherein the step of determining an operator assessment value comprises using fuzzy logic in connection with the vehicle operating data, the operator activity data, the environment data and the operator condition data.

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28. The method of claim 1, wherein the step of determining an operator assessment value comprises using a rules-based decision engine to determine performance of the operator from the vehicle operating data, the operator activity data, the environment data and the operator condition data.

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29. The method of claim 1, further comprising the step of determining the existence of a problem condition associated with the performance of the operator.

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30. The method of claim 1, wherein the operator assessment value is determined on a periodic basis during vehicle operation.

31. An apparatus for assessing vehicle operator performance, the apparatus comprising:

a sensor fusion module, the sensor fusion module being coupled to a vehicle condition sensor, a vehicle exterior sensor, an operator condition

5 sensor and an operator activity sensor respectively providing to the sensor fusion module vehicle condition data, vehicle environment data, operator condition data and operator activity data, the sensor fusion module operable to provide a master condition list based on the data received by the sensor fusion module; and

10 a response selector coupled to the sensor fusion module, the response selector being operable to determine a current operating condition based upon the master condition list and to assess an operator action in response to the current operating condition to provide an operator performance assessment value based upon the master condition list and the operator action.

15 32. The apparatus of claim 31, wherein the vehicle condition data comprises at least one of: vehicle speed, vehicle acceleration, throttle application, brake application, steering wheel input, throttle position, rate of change of throttle position, additional available throttle input, throttle applicator pressure, brake position, rate of change of brake position, additional available brake input, brake applicator pressure, steering wheel position, rate of change of the steering wheel position, operator pressure applied to the steering wheel and additional available steering input.

20 25 33. The apparatus of claim 31, wherein the operator activity data comprises usage data relating to at least one of driving controls, telematics controls, occupant comfort controls, infotainment controls and communication controls.

30 34. The apparatus of claim 31, wherein the operator condition data comprises data relating to at least one of fatigue, intoxication and distraction.

35. The apparatus of claim 31, wherein the vehicle environment data comprises data relating to at least one of road condition, lane following, headway, traffic control and traffic condition.

5 36. The apparatus of claim 31, wherein the operator performance assessment value comprises an inference value.

37. The apparatus of claim 31, wherein the vehicle exterior sensor comprises at least one of radar, laser, video and sonar.

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38. The apparatus of claim 31, wherein the operator activity sensor comprises video.

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